REMARKS

Present Status of the Application

The disclosure was objected to for the erroneous symbol "ð". All pending claims 1-19 were rejected under 35 U.S.C. 112 for support and clarity issues. Claims 8-9, 11 & 13 were rejected under 35 U.S.C. 102(e) as anticipated by Yang (US 2005/0048377), and claims 14-16 rejected under 35 U.S.C. 102(b) as anticipated by Hsu (US 2003/0077519). Under 35 U.S.C. 103(a), claims 10 & 12 were rejected as being unpatentable over Yang and Okamato (US 5,358,807), claim 17 rejected over Hsu, claim 18 rejected over Hsu and Chapple-Sokol (US 5,465,859), claim 19 rejected over Hsu and Yang, and claims 1-7 rejected over AAPA, Okamoto, Hsu, Yang and Chapple-Sokol. In addition, claims 1-19 were provisionally rejected for obviousness-type double patenting (ODP) over copending Application No. 11/161,084 in view of AAPA, Okamoto, Hsu, Yang and Chapple-Sokol.

In response, Applicant has amended paragraphs 9, 18 & 19 of the specification, further amended independent claims 1, 8 & 14, submitted the following remarks, and *signed a terminal disclaimer to overcome the ODP rejections based on the copending Application No. 11/161,084*. Reconsideration of claims 1-19 is respectfully requested.

Discussions of Objection, Rejections under 35 U.S.C. 112 and Amendments

For the objection, Applicant has amended each "ð" in paragraphs 9, 18 & 19 as "π".

In response to the rejections to claims 1-7 & 14-19 under 35 U.S.C. 112, Applicant has limited independent claims 1 & 14 so that any two neighboring dense linear patterns with no phase shift region present between them are arranged ***in a direction different from an extending direction of each dense linear pattern***. This amendment is fully

supported by FIG. 2 of this application, as illustrated below.

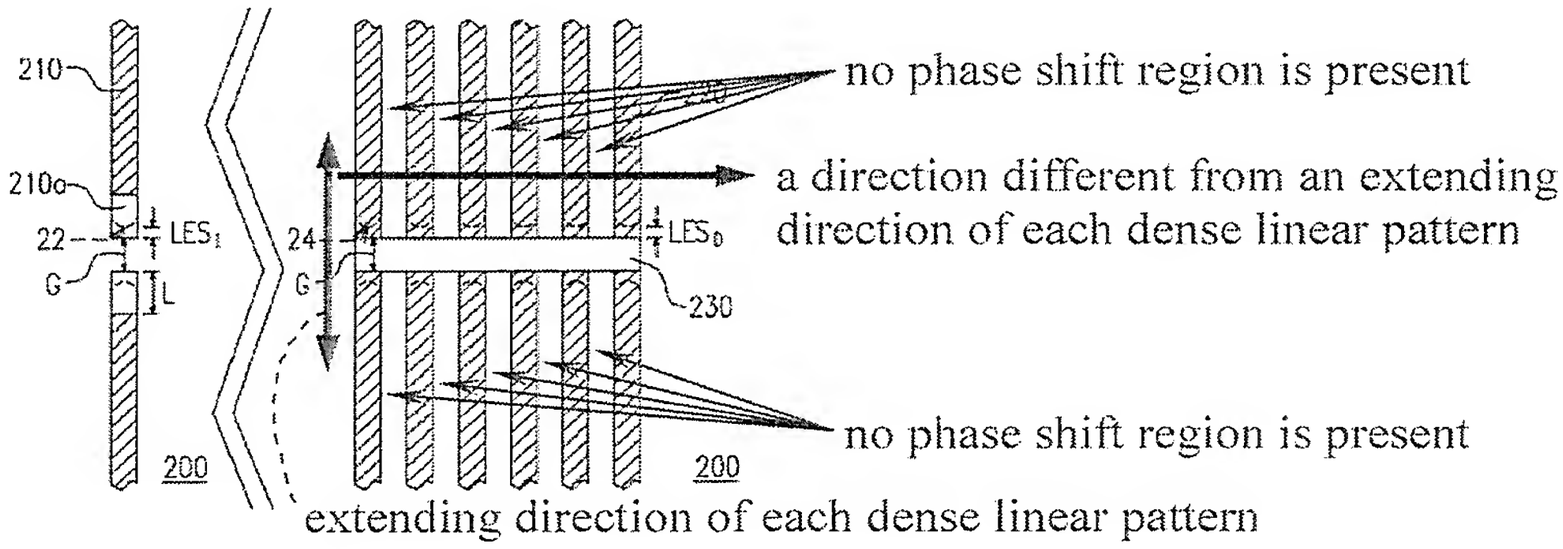

FIG. 2

In response to the rejections to claims 8-13 under 35 U.S.C. 112, Applicant has amended independent claim 8 by removing the limitation "*without a phase shift region adjacent to two sides thereof*" and modifying the limitation "*the transparent end portion is disposed in a manner such that .....*" according to Examiner's suggestion.

The other amendment is the limitation in claim 8 that the transparent end portion of the isolated linear pattern is with a transparency equal to that of the substrate around the isolated linear pattern. This is fully supported by FIG. 2 and related paragraphs, where the transparent end portion 210a of one isolated linear pattern 210 may be a recessed portion of the substrate 200 (**[Para 16]**). It is well known that a phase shift region *as a recessed portion of the substrate of a photomask* has a transparency equal to that of the non-recessed portions of the substrate. For example, in an alternate phase shift mask (Alt-PSM) such as that disclosed in Hsu's Fig. 8, the π-shift regions formed by recessing corresponding portions of the substrate are generally considered to have a transparency of 100% like the non-phase-shift regions do.

Discussions of Rejections under 35 U.S.C. 102(e) or 102(b)

Claims 8-9, 11 & 13 were rejected under 35 U.S.C. 102(e) as anticipated by Yang, and claims 14-16 rejected under 35 U.S.C. 102(b) as anticipated by Hsu. Please note that independent claims 8 & 14 have been further amended.

Amended claim 8 features an isolated linear pattern that includes a transparent end portion with a phase shift of 180° relative to the substrate and with a transparency ***equal to*** a transparency of the substrate around the isolated linear pattern [limitation 1-1], wherein an end of an isolated linear photoresist pattern is defined by the isolated linear pattern in a lithography process and a position of the end of the isolated linear photoresist pattern corresponds to a position of the transparent end portion in the lithography process [limitation 1-2].

Yang fails to disclose the whole of the above feature (**1**) of amended claim 8. In Yang's Fig. 11 that was particularly indicated by Examiner, the π-shift end portion of the isolated linear pattern is either a semi-transparent region with transparency of 6% or a semi-transparent (or transparent, depending on the definition) region with a transparency of 24%. That is, the end portion of the isolated linear pattern in Yang is with a transparency being ***merely 6% or 24%*** of the transparency of the substrate around the isolated linear pattern.

On the other hand, amended claim 14 features that a transparent phase-shift region is located on the substrate adjacent to ends of the dense linear patterns and has a phase shift of 90° relative to the substrate [limitation 2-1], and no phase shift region is present between ***any*** two neighboring dense linear patterns that are arranged in a direction

different from an extending direction of each dense linear pattern [limitation 2-2].

Hsu fails to disclose the whole of the above feature (**2**) of amended claim 14. It is noted that Hsu's Fig. 8 which was particularly indicated by Examiner shows an Alt-PSM, wherein *a half of respective pairs of two neighboring dense linear patterns arranged in a direction different from the extending direction of each dense linear pattern* each have a π-shift region between the two dense linear patterns thereof. Hence in Hsu, ***not any*** *two neighboring dense linear patterns that are arranged in a direction different from an extending direction of each dense linear pattern* have no phase shift region between them, as being contrary to the case of the feature **2**.

For at least the above reasons, Applicant respectfully submits that claims 8 & 14 and claims 9, 11, 13, 15 & 16 dependent therefrom all patently define over the prior art under 35 U.S.C. 102(e) or 102(b).

Discussions of Rejections under 35 U.S.C. 103(a)

Under 35 U.S.C. 103(a), claims 10 & 12 were rejected as being unpatentable over Yang and Okamato, claim 17 rejected over Hsu, claim 18 rejected over Hsu and Chapple-Sokol, claim 19 rejected over Hsu and Yang, and claims 1-7 rejected over AAPA, Okamoto, Hsu, Yang and Chapple-Sokol.

As mentioned above, Yang fails to disclose the feature **1** of amended claim 8 and Hsu fails to disclose the feature **2** of amended claim 14. It is also noted that amended claim 1 also includes the feature **2**. Moreover, Yang fails to suggest/imply the feature **1** and Hsu fails to suggest/imply the feature **2**, for at least the reasons set forth.

For the case of Yang, though the structure in Fig. 11 satisfies the above limitation

1-2 of feature **1**, the transparency of the end portion of an isolated linear pattern in Yang is merely 6% or 24%. Since a transparency of 6% or 24% is much lower than 100% (equal to), it is non-obvious to greatly increase the transparency of the end portion of an isolated linear pattern in Yang to 100% to further satisfy the limitation **1-1** of feature **1**.

It is also noted that when the transparency of *a π-shift end portion of an isolated linear pattern* satisfying the limitation **1-2** is set at 100% to further satisfy the limitation **1-1** as in the case of amended claim 8, line-end shortening is inhibited more effectively. Accordingly, the combination of the limitations **1-1** & **1-2** of feature **1** has an ***unexpected effect*** over the prior art.

As for the case of Hsu, the 90°-shift regions 49 (= third transparent region in the Abstract) in FIG. 8 of Hsu are intended to effectively cancel *phase conflict (see Abstract) between the zero-shift regions and the 180°-shift regions that would cause ghost lines*, but cause no LES inhibition under the condition. Accordingly, in view of Hsu, one of ordinary skilled in the art would have no motivation to apply such 90°-shift regions to a case where no phase conflict is present, such as *a case where no phase shift region is present between **any** two neighboring dense linear patterns that are arranged in a direction different from an extending direction of each dense linear pattern* as described in amended claim 1/14.

It is also noted that when the above limitations **2-1** and **2-2** of feature **2** are satisfied simultaneously as in the case of amended claim 1/14, line-end shortening (LES) can be inhibited. Accordingly, the combination of the limitations **2-1** & **2-2** of the feature **2** has an ***unexpected effect*** over the prior art.

Furthermore, it is noted that Okamoto and Chapple-Sokol that were cited for minor features also fail to disclose, suggest or imply the feature **1** or **2** of claim 8 or 1/14.

For at least the above reasons, Applicant submits that claim 1, 8 & 14 and claims 2-7, 9-13 & 15-19 respectively dependent therefrom all patently define over the prior art.

CONCLUSION

In view of the foregoing, it is believed that all pending claims 1-19 are in proper condition for allowance. If the Examiner believes that a conference would be of value in expediting the prosecution of this application, he is cordially invited to telephone the undersigned counsel to arrange for such a conference.

Respectfully submitted,

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